

Our ref: KON-1859 Client's ref: P6459-001-0000-US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of:	:	
H. YOSHIKAWA, et al	:	Art Unit: 1756
	:	
Appln. No. : 10/800,569	:	Examiner: Janis L. Dote
	:	
Filed: March 15, 2004	:	
	:	
Title : AN IMAGE FORMING	:	
METHOD AND IMAGE	:	
FORMING APPARATUS	:	

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PTO's Confirmation #9832

132 DECLARATION

Hon. Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S i r:

I, Eiichi Sakai, hereby declare and state as follows:

1. I am not one of the named Inventors in the above-identified Application, however, I have read and understand the above-identified Application to include its claims.

2. I graduated from Waseda University having majored in Applied Physics. I was awarded a Degree of Masters of Engineering in 1981 from Waseda University. Since October of that year, I was employed by Konica Corporation. Konica Corporation became a holding company and divided into separate companies to include Konica Business Technologies, Inc. Konica Business Technologies, Inc. changed its name to Konica Minolta Business Technologies, Inc. and I am currently employed by Konica Minolta Business Technologies, Inc. Throughout my employment for Konica/Konica Minolta, I have been engaged in the research and development in the field of electrophotographic receptors and related materials.

3. I am aware that the Examiner has cited and applied Asano (US Patent Pub. 2003/0180646) in combination with Japanese Patent No. 09-274417; Uchida (US Pub. 2002/0076636) and Hagi (US 6,338,929) in order to reject the claims in this Application. I have read and understand the teachings of the references Asano, Uchida and Hagi.

4. I am of the opinion that the toner as specified in Claim 1 in combination with the specific photoreceptor as specified in Claim 1 has surprising and unexpected results compared to the teachings in the references. Specifically, I believe that the combination of the average circularity degree and the number of carbon atoms of the releasing agent used for the toner and the average particle diameter of the hydrophobic silica particles, are essential and provide surprising and unexpected results when combined. In order to demonstrate the surprising and unexpected results, tests have been performed and are reported herein. These tests were performed by me or under my direct supervision and control.

5. Five photoreceptors, labeled Photoreceptor No. 1-5, were prepared in the same manner as Photoreceptor 1 of Asano as taught in paragraphs 253 to 257, except that the hydrophobic silica used in the charge transport layer (CTL) was varied to have an average particle diameter of 0.5, 1, 50, 98, or 100 nm as shown in Table 1 attached hereto. Additionally, the conditions of dispersing the hydrophobic silica in the CTL solution was changed so that each one of the

Photoreceptors 1-5 had the same Ra as shown in Table 1.

6. Eight different colored particles corresponding to Toners 1-8 in Table 1 were prepared in the same manner as colored particle 1Bk of Uchida as taught in paragraphs 152-161 of Uchida except that the releasing agent which was used to prepare the colored particles was the one shown in Table 1. Additionally, the time for stirring the solution after the addition of the sodium chloride, as described in paragraph 161 of Uchida, was changed so that the average degree of circularity was varied as shown in Table 1.

7. The colored particles were then mixed with the four external additives used for Example 1 of Hagi, by means of a HENSCHTEL MIXER in the same manner as taught in Hagi, Column 10, for mixing the external additives with the colored particles. Finally, the carrier shown in paragraph 179 of Uchida was mixed at a concentration of 6% to form Toners 1-8.

8. In order to test toners and different photoreceptors which had been prepared, a digital color printer, having a cleaning device as shown in Figure 5 of Asano, paragraph 292, was employed. Then the combination of toners and photoreceptors were tested in accordance with the instant Application as taught on pages 35 to 38.

9. It should be noted that Examples 1-6 in Table 1 are comparative examples because the toner has a circularity degree that falls outside the claimed range while each of the photoreceptors employed was within the claimed range. Namely, the average of the circularity degree of the toner was less than 0.94 while the average particle diameter of the silica was between 1 nm and less than 100 nm.

10. It should be noted that Samples 7, 12, 17 and 22 all had a toner that fell within the claimed range, having an average circular degree of 0.94 but that the photoreceptors were outside the claimed range having average primary particle diameter of silica below 1 nm, i.e. 0.5 nm.

11. Example Nos. 11, 16, 21 and 26 all had a toner with an average of circular degree of 0.94, within the claimed range, but had a photoreceptor that fell outside the claimed range because the average primary particle diameter of the silica was 100 nm, above the claimed range.

12. Example Nos. 8-10, 13-15, 18-20 and 23-25 had both toners and photoreceptors within the claimed range.

13. I am of the opinion that there are unexpected results are shown by the data in Table 1 in that the combination of the average of circularity degree of the toner in combination with the number of carbon atoms of the releasing agent and the average primary particle diameter of the silica provide superior results to the other results.

14. Comparing Examples 1-3 and 18-20, it can be seen that the average of circularity degree of the toner is an essential feature because Examples 18-20 are superior to Examples 1-3. The same is true for

Example Nos. 4-6 versus 23-25 because Examples 23-25 are far superior to Examples 4-6.

15. Comparing Examples 8-10 to 18-20, it can be seen that the number of carbon atoms of the carboxylic acid or the alcohol component of the releasing agent is an essential feature. Examples 18-20 are superior to that of Examples 8-10. Also, from a comparison of Examples 13-15 to Examples 23-25, it can be seen that Examples 23-25 are superior to that of Examples 13-15.

16. A comparison of Example 17 with Examples 18-20 it can be seen that having a hydrophilic silica particle having a number average of the primary particle diameter below the claimed range provides inferior results. By comparing Example 21 to Examples 18-20, it can be seen that by having hydrophobic silica with a number average particle diameter greater than the claimed range also provides inferior result.

17. A comparison of Examples 22-26 also illustrates the criticality of the size of the silica particles in that Examples 22 and 26 both employed photoreceptors that had the silica outside the claimed range while

Examples 23-25 employed photoreceptors with silica particles within the claimed range. The superiority shown by Examples 23-25 compared to Examples 22 and 26 clearly demonstrates the essential feature of the size of the silica particles.

18. Unexpected results can also be seen by comparing Examples 7 and 8 to Examples 17 and 18. In Examples 7 and 8, there is only a slight difference between the two tests, whereas, there is a significant difference between Examples 17 and 18. I find this difference to be surprising and unexpected.

19. It can also be seen by comparing Examples 10 and 11 versus Examples 20 and 21 that surprising and unexpected results are obtained. There is a small difference between Examples 10 and 11 compared to a significant difference between Examples 20 and 21. I believe this difference also shows the surprising and unexpected results of the present invention.

20. Based on the results and the data of Table 1, I believe that combining the toner, as recited in Claim 1 with the photoreceptor as recited in Claim 1, shows surprising and unexpected results compared to using the toner or the photoreceptor individually as demonstrated by the data in Table 1.

21. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: This 16th day of September, 2008. Eiichi Sakai
Eiichi Sakai

DCL/mr

TABLE 1

Example No.	Toner						Photoreceptor			Evaluation of			Remarks
	Toner No.	Average of circular degree	Releasing agent				No.	Average primary particle diameter of silica (nm)	Surface roughness Ra (1 m)	Damage	Cleaning	Filming	
			Formula	n	m	maximum number of carbon of carboxylic or alcoholic component							
1	1	0.92	1	14	4	16	2	1	0.06	B	C	D	Comp.
2	1	0.92	1	14	4	16	3	50	0.06	A	C	D	Comp.
3	1	0.92	1	14	4	16	4	98	0.06	B	C	D	Comp.
4	2	0.92	1	8	15	16	2	1	0.06	B	C	D	Comp.
5	2	0.92	1	8	15	16	3	50	0.06	A	C	D	Comp.
6	2	0.92	1	8	15	16	4	98	0.06	B	C	D	Comp.
7	3	0.94	1	10	4	12	1	0.5	0.06	D	D	D	Comp.
8	3	0.94	1	10	4	12	2	1	0.06	B	C	D	Comp.
9	3	0.94	1	10	4	12	3	50	0.06	A	C	D	Comp.
10	3	0.94	1	10	4	12	4	98	0.06	B	C	D	Comp.
11	3	0.94	1	10	4	12	5	100	0.06	B	D	D	Comp.
12	4	0.94	1	8	14	15	1	0.5	0.06	D	D	D	Comp.
13	4	0.94	1	8	14	15	2	1	0.06	B	C	D	Comp.
14	4	0.94	1	8	14	15	3	50	0.06	A	C	D	Comp.
15	4	0.94	1	8	14	15	4	98	0.06	B	C	D	Comp.
16	4	0.94	1	8	14	15	5	100	0.06	B	D	D	Comp.
17	5	0.94	1	14	4	16	1	0.5	0.06	D	D	D	Comp.
18	5	0.94	1	14	4	16	2	1	0.06	B	B	B	Inv.
19	5	0.94	1	14	4	16	3	50	0.06	A	A	A	Inv.
20	5	0.94	1	14	4	16	4	98	0.06	B	B	B	Inv.
21	5	0.94	1	14	4	16	5	100	0.06	B	D	B	Comp.
22	6	0.94	1	8	15	16	1	0.5	0.06	D	D	D	Comp.
23	6	0.94	1	8	15	16	2	1	0.06	B	B	B	Inv.
24	6	0.94	1	8	15	16	3	50	0.06	A	A	A	Inv.
25	6	0.94	1	8	15	16	4	98	0.06	B	B	B	Inv.
26	6	0.94	1	8	15	16	5	100	0.06	B	D	B	Comp.
27	7	0.94	1	22	4	24	2	1	0.06	B	B	B	Inv.
28	7	0.94	1	22	4	24	3	50	0.06	A	A	A	Inv.
29	7	0.94	1	22	4	24	4	98	0.06	B	B	B	Inv.
30	8	0.94	2			22	2	1	0.06	B	B	B	Inv.
31	8	0.94	2			22	3	50	0.06	A	A	A	Inv.
32	8	0.94	2			22	4	98	0.06	B	B	B	Inv.

Formula 1: $\text{CH}_3(\text{CH}_2)_n\text{COO}(\text{CH}_2)_m\text{CH}_3$

Formula 2: Compound 21) of Uchida (US2002/0076636)

TABLE 1

Example No.	Toner						Photoreceptor			Evaluation of			Remarks
	Toner No.	Average of circular degree	Releasing agent				No.	Average primary particle diameter of silica (nm)	Surface roughness Ra (l m)	Damage	Cleaning	Fliming	
			Formula	n	m	maximum number of carbon of carboxylic or alcoholic component							
1	1	0.92	1	14	4	16	2	1	0.06	B	C	D	Comp.
2	1	0.92	1	14	4	16	3	50	0.06	A	C	D	Comp.
3	1	0.92	1	14	4	16	4	98	0.06	B	C	D	Comp.
4	2	0.92	1	8	15	16	2	1	0.06	B	C	D	Comp.
5	2	0.92	1	8	15	16	3	50	0.06	A	C	D	Comp.
6	2	0.92	1	8	15	16	4	98	0.06	B	C	D	Comp.
7	3	0.94	1	10	4	12	1	0.5	0.06	D	D	D	Comp.
8	3	0.94	1	10	4	12	2	1	0.06	B	C	D	Comp.
9	3	0.94	1	10	4	12	3	50	0.06	A	C	D	Comp.
10	3	0.94	1	10	4	12	4	98	0.06	B	C	D	Comp.
11	3	0.94	1	10	4	12	5	100	0.06	B	D	D	Comp.
12	4	0.94	1	8	14	15	1	0.5	0.06	D	D	D	Comp.
13	4	0.94	1	8	14	15	2	1	0.06	B	C	D	Comp.
14	4	0.94	1	8	14	15	3	50	0.06	A	C	D	Comp.
15	4	0.94	1	8	14	15	4	98	0.06	B	C	D	Comp.
16	4	0.94	1	8	14	15	5	100	0.06	B	D	D	Comp.
17	5	0.94	1	14	4	16	1	0.5	0.06	D	D	D	Comp.
18	5	0.94	1	14	4	16	2	1	0.06	B	B	B	Inv.
19	5	0.94	1	14	4	16	3	50	0.06	A	A	A	Inv.
20	5	0.94	1	14	4	16	4	98	0.06	B	B	B	Inv.
21	5	0.94	1	14	4	16	5	100	0.06	B	D	B	Comp.
22	6	0.94	1	8	15	16	1	0.5	0.06	D	D	D	Comp.
23	6	0.94	1	8	15	16	2	1	0.06	B	B	B	Inv.
24	6	0.94	1	8	15	16	3	50	0.06	A	A	A	Inv.
25	6	0.94	1	8	15	16	4	98	0.06	B	B	B	Inv.
26	6	0.94	1	8	15	16	5	100	0.06	B	D	B	Comp.
27	7	0.94	1	22	4	24	2	1	0.06	B	B	B	Inv.
28	7	0.94	1	22	4	24	3	50	0.06	A	A	A	Inv.
29	7	0.94	1	22	4	24	4	98	0.06	B	B	B	Inv.
30	8	0.94	2			22	2	1	0.06	B	B	B	Inv.
31	8	0.94	2			22	3	50	0.06	A	A	A	Inv.
32	8	0.94	2			22	4	98	0.06	B	B	B	Inv.

Formula 1: $\text{CH}_3(\text{CH}_2)_n\text{COO}(\text{CH}_2)_m\text{CH}_3$

Formula 2: Compound 21) of Uchida (US2002/0076636)